

1. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{9x^3 + 36x^2 + 44x + 16}{3x^3 + 20x^2 + 48x + 32}$$

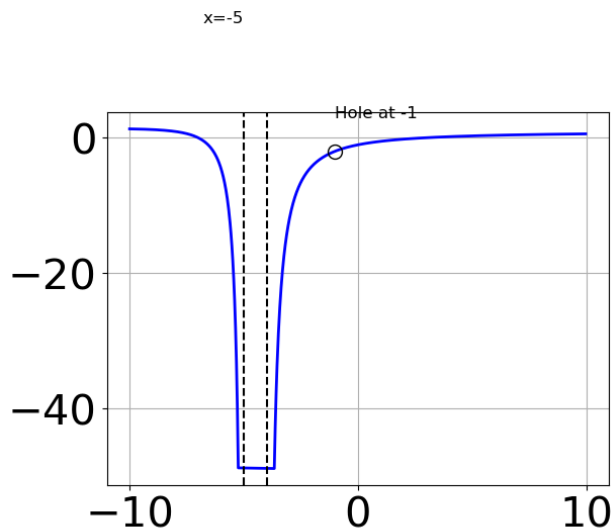
- A. Horizontal Asymptote of  $y = 3.000$
  - B. Horizontal Asymptote of  $y = 0$
  - C. Vertical Asymptote of  $y = -2$
  - D. None of the above
  - E. Vertical Asymptote of  $y = -4.000$
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2. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{16x^3 - 16x^2 - 25x + 25}{12x^2 + x - 20}$$

- A. Holes at  $x = -1.333$  and  $x = 1.25$  with no vertical asymptotes.
  - B. Vertical Asymptote of  $x = -1.333$  and hole at  $x = 1.25$
  - C. Vertical Asymptote of  $x = 1.333$  and hole at  $x = 1.25$
  - D. Vertical Asymptotes of  $x = -1.333$  and  $x = -1.25$  with a hole at  $x = 1.25$
  - E. Vertical Asymptotes of  $x = -1.333$  and  $x = 1.25$  with no holes.
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3. Which of the following functions *could* be the graph below?



A.  $f(x) = \frac{x^3 + 5.0x^2 - 17.0x - 21.0}{x^3 + 10.0x^2 + 29.0x + 20.0}$

B.  $f(x) = \frac{x^3 - 5.0x^2 - 17.0x + 21.0}{x^3 - 10.0x^2 + 29.0x - 20.0}$

C.  $f(x) = \frac{x^3 - 3.0x^2 - 25.0x - 21.0}{x^3 - 10.0x^2 + 29.0x - 20.0}$

D.  $f(x) = \frac{x^3 + 3.0x^2 - 25.0x + 21.0}{x^3 + 10.0x^2 + 29.0x + 20.0}$

E. None of the above are possible equations for the graph.

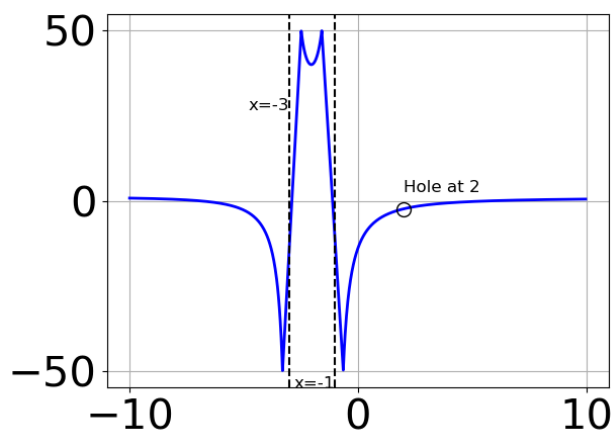
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4. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{4x^3 + 12x^2 - 25x - 75}{2x^2 + 13x + 20}$$

- A. Horizontal Asymptote of  $y = 2.0$
- B. Horizontal Asymptote at  $y = -4.0$
- C. Horizontal Asymptote of  $y = -4.0$  and Oblique Asymptote of  $y = 2x - 7$

- D. Horizontal Asymptote of  $y = 2.0$  and Oblique Asymptote of  $y = 2x - 7$
- E. Oblique Asymptote of  $y = 2x - 7$ .

5. Which of the following functions *could* be the graph below?



- A.  $f(x) = \frac{x^3 - 3.0x^2 - 40.0x + 84.0}{x^3 - 2.0x^2 - 5.0x + 6.0}$
- B.  $f(x) = \frac{x^3 - 1.0x^2 - 44.0x + 84.0}{x^3 + 2.0x^2 - 5.0x - 6.0}$
- C.  $f(x) = \frac{x^3 + x^2 - 44.0x - 84.0}{x^3 - 2.0x^2 - 5.0x + 6.0}$
- D.  $f(x) = \frac{x^3 - 2.0x^2 - 45.0x + 126.0}{x^3 + 2.0x^2 - 5.0x - 6.0}$
- E. None of the above are possible equations for the graph.

6. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{4x^3 - 28x^2 + 63x - 45}{6x^2 - 19x + 10}$$

- A. Holes at  $x = 0.667$  and  $x = 2.5$  with no vertical asymptotes.
- B. Vertical Asymptotes of  $x = 0.667$  and  $x = 2.5$  with no holes.
- C. Vertical Asymptote of  $x = 0.667$  and hole at  $x = 2.5$

- D. Vertical Asymptotes of  $x = 0.667$  and  $x = 1.5$  with a hole at  $x = 2.5$
- E. Vertical Asymptote of  $x = 0.667$  and hole at  $x = 2.5$
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7. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 + 7x^2 - 30x - 25}{3x^2 + 10x - 25}$$

- A. Horizontal Asymptote of  $y = 4.0$
- B. Oblique Asymptote of  $y = 4x - 11$ .
- C. Horizontal Asymptote at  $y = -5.0$
- D. Horizontal Asymptote of  $y = -5.0$  and Oblique Asymptote of  $y = 4x - 11$
- E. Horizontal Asymptote of  $y = 4.0$  and Oblique Asymptote of  $y = 4x - 11$
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8. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{5x^2 + 29x + 20}{15x^3 + 62x^2 - 32}$$

- A. Oblique Asymptote of  $y = 3x - 5$ .
- B. Horizontal Asymptote at  $y = -5.000$
- C. Horizontal Asymptote of  $y = 0.333$  and Oblique Asymptote of  $y = 3x - 5$
- D. Horizontal Asymptote of  $y = 0.333$
- E. Horizontal Asymptote of  $y = 0$
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9. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 2x^2 - 63x + 45}{6x^2 - 19x + 10}$$

- A. Vertical Asymptotes of  $x = 0.667$  and  $x = 0.75$  with a hole at  $x = 2.5$
- B. Vertical Asymptote of  $x = 1.333$  and hole at  $x = 2.5$
- C. Holes at  $x = 0.667$  and  $x = 2.5$  with no vertical asymptotes.
- D. Vertical Asymptotes of  $x = 0.667$  and  $x = 2.5$  with no holes.
- E. Vertical Asymptote of  $x = 0.667$  and hole at  $x = 2.5$

10. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 - 49x^2 + 125x - 100}{8x^2 - 26x + 15}$$

- A. Vertical Asymptotes of  $x = 0.75$  and  $x = 1.667$  with a hole at  $x = 2.5$
- B. Vertical Asymptotes of  $x = 0.75$  and  $x = 2.5$  with no holes.
- C. Vertical Asymptote of  $x = 0.75$  and hole at  $x = 2.5$
- D. Vertical Asymptote of  $x = 0.75$  and hole at  $x = 2.5$
- E. Holes at  $x = 0.75$  and  $x = 2.5$  with no vertical asymptotes.